

Theory and methodology of Business-Model Formation

SUMMARY. The main aim of the research is to open the content of the effective business-model management, first the business-model content analysis approach application. After this the complementary assets and multidimensional innovation were put as a basis to form the enterprise business-models. The complementary assets access formation for the sea trade port is developed through the different strategies. Generic and specialized complementary assets list was presented. Business-model formation through multidimensional innovation is supported by the operational activities list. The business-model described as a mechanism to create and store of added value with the appropriate directions for strategic decisions.

KEYWORDS: business-model, sea trade port, financial performance, return on equity, complementary assets, multidimensional innovation

DYNAMIC AND COMPARATIVE ANALYSIS OF THE BUSINESS-MODELS (SEA TRADE PORT CASE)

Competitiveness increase and added values creation is a highlight of theorists and practitioners in the context of structure and principles of business organization. Business-model concept is one of the main inventions to solve this task. The most forceful, effective and long-term profitable are the organizations, which are founded on the correctly selected business-models with the appropriate component structure. Business-model studies were started in the 1990th. In course of time the actuality of this topic was only increasing. The business-model research is taking place with the usage of descriptive and constructive definitions. The constructive ones are concentrated on the system building (Alexander Osterwalder, Yves Pigneur, Natalya Strekalova, Tamaz Va-

^[1] Vitalii Nitsenko, Doctor of Economic Sciences, Associate Professor of the Department of Accounting, Analysis and Audit, Odessa I.I. Mechnikov National University (Ukraine), vitaliinitsenko@gmail.com.

^[2] Iryna Nyenno, Doctor of Economic Sciences, Associate Professor of the Department of Economics and Management, Odessa I.I. Mechnikov National University (Ukraine), inyenno@onu.edu.ua.

^[3] Tetyana Levinska, Lecturer of the Department of Economic Theory and Business Undertakings on a Marine transport, National University "Odessa Maritime Academy", (Ukraine), pelegrim08@ukr.net.

shakmadze), while descriptive ones set up the characteristics of this category (Raphael Amit, Christoph Zott, Jane C. Linder, Richard S. Rosenbloom, Alan Smith, Scott M. Shafer). In the both cases the business-model describes the way, the company is implementing its business in order to create the added value. The range of authors consider the external impact of the economic environment on the modern business-models. They research their characteristics. The attention of such scientists as Henry W. Chesbrough, Lars Schweizer, Don Debelak, Adrian Slywotzky, Ludmila Frolova, F. Simanovskiy is directed on the classification approaches of the business-models. One of the still unsolved task is the introduction of the practical approach to the business-models analysis.

The purpose of this research is to enhance the practical approach to business-model development for the sea trade port. To achieve this goal the range of tasks as consequently solved, – namely: the business-model structure was analyzed; the key indicators of the business-model decomposition for the sea trade ports of Ukraine were calculated and their comparative analysis was conducted; the business-model was visualized through the ertsgam form.

For the practical application of business-model let's specify its understanding and formation criterions. As defined by Larry Bossidy and Ram Charan, the business-model terminology should be understood as a very ancient analytical methodic, which gives the real possibility to cover completely that process, due to which it is possible to earn money^[4]. The full and effective business-model is possible only in the conditions of harmonization of the financial purposes and the external environment with the internal possibilities with the help of so called iteration^[5]. Iteration occur at the regular meetings for company's strategy direction. Business-model gives the possibility to form the holistic vision of the business reality. The authors divided six accustomed behavioral models, which are the most often failure reasons for reality evaluation attempts. These are: incomplete information, selective perception, substitution of the reality by desired ones, fear, emotional blindness, unreal market forecasting. The new factors of external influence are:

1. The existence of zombie-economies zombie. Joseph Schumpeter introduced the term “creative destruction” of capitalism to describe the process of replacing the incompetent or retarded companies for the new and energetic players. However, we are witnessing a public-private support of bankrupt companies, particularly in the transport and logistics sector, where lenders are prepared brisk zombie companies with excess unused production capacity using credit and leasing tools, while effective performing state enterprises are being privatized.
2. The mediators-killers, which are mass retailers in e-commerce.

Alexey Bereznoy emphasizes the interdisciplinary nature of the term

^[4] Л. Босси́ди, Р. Чаран, *Сталкиваясь с реальностью. Как адаптировать бизнес-модель к меняющейся среде*, Moscow 2007, 288 p.

^[5] Ibidem.

“business model”. This nature explains the incomplete processing of this term in the literature on economic theory, the theory of strategy and organization, where business model is mentioned, without giving a precise definition^[6]. This definition includes a number of specific and fundamental to every company features, this is: 1) a way to create consumer value and to deliver it to the target group of consumers; 2) way of generating income; 3) method of use the existing resources and processes to create sustainable mechanisms of interaction between mechanism of creation the consumer value and profits generation, and provision of sustainable competitive advantages. He emphasizes the business models difference from the other tools of competition, such as reduced prices; consistently improvement of the product or placing new products on the market. He believes that the business model makes system changes that go beyond trade margin.

The methodology of this concept describes business-model as “specially synthesized for easy research facility”. “The business model is a method of doing business in the company (its structure, products, services, delivery methods and customer support, increased market value), the rules of this business conducting, that are underlying in the strategy and business performance criteria. The business-model includes all business functions and all functional relationships within the organization. It covers for the entities financial model, organizational model, sales model, the client model, production model, distribution model, model of supplies, etc. The result is a complex relationship and interaction between these models and even components within them”^[7].

Summarizing the approaches to “business-model” definitions, Anna Soolyatte noted that major differences in the interpretation of the term “business-model” occur in people, who are oriented on technology, and people who are oriented on business. For the respondents who are customer-oriented, “business model” definition is how the company selects the consumer, defines and delineates its proposals, allocates resources to determine which tasks it can perform by its own and for which it will attract professionals from outside, enters the market, creates value for the customer and receives income from it”^[8]. For respondents, who are focused on processes/roles (approach directed inside the organization), “business-model” is a description of the company as a complex system with a given accuracy. In the business-model framework all objects, processes, rules of operations, the existing development strategy and the criteria for evaluating the effectiveness of the system are shown.

^[6] А. Березной, *Инновационные бизнес-модели в конкурентной стратегии крупных корпораций*, “Вопросы экономики” 2014, № 9, p. 65-81.

^[7] С. Тарасов, *Глоссарий системного аналитика предприятия (проект arbinada.com)*, <http://vocable.ru/> (accessed 21.09.2018).

^[8] А.Ю. Солятьга, *Бизнес-модель – ключ к развитию бизнеса на основе инноваций*, “Менеджмент инноваций” 2010, №1 (09), p. 6-15.

By Charles R. Moborn and in the “Blue Ocean Strategy”^[9] believe that the global business space can be divided into two parts. The red part – is already known existing markets. Blue space is free from competition, the demand for it can be created. The task of the company, which operates in the space of blue ocean – is the simultaneous achievement of differentiation and cost reduction. They offered the tool, called “strategic canvas”, which is measured by the created for the consumer value. Canvas includes the following options: popularity, time of existing, comfort of use, functionality, security, quality of work, timeliness, quantity of advertising banners, prevalence, design. To adjust the value curve it is advisable to use the tool “model of four actions” (Figure 1).

FIGURE 1. Model of the four actions in the business-model

	Cost reduction	Value creation
Radical action	To cancel	To create
Partial action	To reduce	To increase

The construction of a new curve requires answers to four questions:

1. Which factors impact should be significantly reduced in comparison with existing standards in the industry?
2. What impact factors that are considered natural in the industry, should be canceled while planning development?
3. Which factors impact should be significantly increased in comparison with existing standards in the industry?
4. What are the factors that are still not offered in the industry and should be created?

A key proposal of the authors is the refusal of the strategy of winning market share. Market leaders follow their own logic of innovation value.

A. Slyvotzky A. in his research “Migration value. What will happen with your business tomorrow?”^[10] explores how value is migrating due to changes in business-models. He defines the business-model as a way of business organization in the industry and measures it by the ratio of enterprise market value to the gross turnover. He believes that this formula best reflects the migration values in the industry, and underlines that the rise of companies value is based not only on technological innovation, but on innovative business-models. The mechanism of the formation of the business model represents Figure 2.

^[9] У. Чан Ким, Р. Моборн, *Стратегия голубого океана*, Moscow 2013, 304 p.

^[10] А. Сливотски, *Миграция ценности. Что будет с вашим бизнесом послезавтра?*, Moscow 2006, 432 p.

FIGURE 2. Mechanism of business-model formation by A. Sliwotskiy

Business-model elements	Main components	Key issues
Consumer choice	Fundamental hypothesis (business-model basis)	Clients change; Clients priorities change;
	Client choice	Method to provide the business profitability; Target society.
Unique value proposal	Logistics and partnership connections	Purchase system; Relations with suppliers and partners;
	Production and sales organization	Technologies and method of production organization;
	System of products development; Research and development	Marketing system; Cost managing; Research and development organization.
Profit model	Management of profit formation	Mechanism of profit generation; Method to attract investors;
	Management of investors capital	Payment mechanism with contractors.
Strategic control	Points of strategic financial control	Protection of investments, earnings, profits.
	Points of strategic control for value creation	System of created value protection.
Activity volume	Company's organizational profile	Business volume and company organizational structure; Human resource management mechanism.

Gary Hamel in the study “At the head of the revolution”^[11] states that future changes in the company may be subject to deliberate formation of business-model. He believes its structural elements are: the client interface; key strategy; strategic resources; value network. The effectiveness of the business model depends on the main factors determining the profit potential (Figure 3).

^[11] Г. Хэмел, *Во главе революции*, Moscow 2007, 368 p.

FIGURE 3. Business-model elements by G. Hamel

Consumer benefits	Configuration		Company's limitation
Client interface	Key strategy	Strategic resources	Value network
Performance and support;	Business-mission;	Key competencies;	Suppliers;
Information and ideas;	Coverage of products/ markets;	Strategic assets;	Partners;
Relationship dynamic;	Differentiation basis.	Key processes.	Clients.
Price structure.			
Effectiveness	Uniqueness	Consistency	Profit engines

The profitability of the business model in his view is reinforced by four categories: output, which is increasing; neutralization of competitors; strategic saving; strategic flexibility. The first two categories he identifies with the monopoly. Thus he says that the purpose of the business-model is to search a real monopoly effect. Strategic savings are not savings arising from operational efficiency. However, it is the result of effective business-models in three categories: saving thank to scale; saving thank to specialization or focus; saving thank to scope. Strategic flexibility is ensured by optimum amount of product portfolio, operating liveliness and low breakeven level.

Mark Johnson, Clayton Christensen and Henning Kagermann^[12], consider, that business-model consists of the following elements:

1. Key resources: personnel, technologies, products, equipment, information, delivery channels, partnerships, alliances and so on. Under the meaning of “key” it is understood the resources, that makes the product competitive.
2. Key processes: system of the performance measurement, company’s rules, norm and codes. This element should give the understanding about the organization of internal processes of production with the aim of its volume increase.
3. The proposed to customer value: a key customer; a need that can be met; supply company supply.
4. Profit formula: revenue generating model; cost structure; marginal revenue model; turnover speed of resources. It gives an idea of how the company makes money.

The perspective business model should be based on a clear idea of what exact need will satisfy the new product or service, which will be the formula of profit, that provides the product; whether the existing business model of the organization suits to the plans of production, sales and compliance profit formula. The authors consider creating a business-model appropriate for the following reasons:

^[12] М. Джонсон, К. Кристенсен, Х. Кагерманн, *Обновление бизнес-модели*, “Harvard Business Review. Россия” 2009, <http://www.hbr-russia.ru/issue/> (accessed 21.09.2018).

1. Availability of the opportunities to meet a large group of potential customers for whom the market is not yet established.
2. Promotion of fundamentally new technologies, for instance in the adjacent markets.
3. Implementation of a fundamentally new work for the production of goods or provision of services.
4. Under the threat of competitors in innovative products in the cheapest price segment.
5. Changing standards of competition as a result of transformation and progress of the industry.

An important contribution of H.W. Chesbrough is his formulation of six criteria (requirements of the business model), the implementation of which, according to the researcher, gives the company a significant competitive advantage. According to H. Chesbrough business-model has the following functions^[13]:

1. To form the essence of the value proposition that is the value that creates a friendly offer, which is based on the new technology.
2. To identify a market segment that is to identify users for whom this technology is useful and the purpose for which it is used.
3. To determine the value chain structure of the company, which is required for the creation and dissemination of proposals. To identify additional assets needed to support the position of the company in this chain.
4. To specify the mechanism of generating revenue for the company and to assess the cost structure and gross target profit during using suggestions, including selected options of value proposition and value chain structure.
5. To describe the firm's network values, which connect suppliers and customers, including identification of potential partners and competitors.
6. To formulate competitive strategy, through which the company will receive an innovative edge over competitors and keep it.

The business-model of the company is acting as a potential generator of cash flows that affects the market value of the organization. Under these circumstances the value of the enterprise itself is created by the certain internal factors of this model, the result of which is measured by return on equity (Return On Equity, ROE). Therefore, based on this metric it is possible to analyze and evaluate the business-model.

Return on equity represented as a 12-factor model. As such, the model will allow to analyze in details the financial and economic activity of the enterprise^[14]. Table 1 presents data for detailed analysis of return on equity ROE (Return On Equity).

^[13] Г. Чесбро, *Открытые инновации. Создание прибыльных технологий*, Moscow 2007, 336 p.

^[14] Т.Т. Вашакмадзе, *Сравнительный анализ бизнес-моделей компании*, "Экономика и жизнь" 2012, № 16 (45), p. 35-45.

TABLE 1. Financial performance of SE "Izmail sea trade port" in 2012 – 2014, thous. UAH

Nº	Performance	2012	2013	2014
1	Net sales income (for products, jobs, services)	170 689	141 644	210 229
2	Gross profit	-3 998	7 600	48 514
3	Profit before taxation and credit payments	-24 993	-10 259	36 900
4	Profit before taxation	-26 316	-17 376	36 905
5	Net profit	-26 316	-17 376	30 409
6	Cash funds	476	1 209	12 342
7	Receivables	22 533	10 455	12 628
8	Stocks	15 182	12 699	20 095
9	Other current assets	469	742	592
10	Fixed assets	200 057	388 403	373 763
11	Other non-current assets	5 254	3 279	4 162
12	Borrowed capital	17 407	7 916	1 976
13	Equity	181 181	308 120	328 793
14	Interest-free liabilities	45 383	100 751	92 813

Source: the data of financial reporting of SE "Izmail sea trade port".

The results of the 12-factors decomposition of ROE for the SE "Izmail sea trade port" for the years 2012 – 2014 are shown in Table 2.

TABLE 2. Calculations of the financial and economic performance of the SE "Izmail sea trade port" in 2012-2014, thous. UAH for the 12-factors model ROE

Nº	Ratio	Analysis meaning			Ertsgam meaning		
		2012	2013	2014	2012	2013	2014
1	Gross margin,%	0	5	23	0.00	0.57	2.43
2	Effect from commercial and managerial costs	0.00	0.00	0.76	0.00	0.00	3.00
3	Effect from financial activity	0.00	0.00	1.00	0.00	0.00	3.00
4	Tax effect	0.00	0.00	0.82	0.00	0.00	3.00
5	Cash funds management, days	1.02	3.12	21.43	3.00	2.73	0.40
6	Receivables management, days	48.18	26.94	21.92	0.67	1.20	1.48
7	Stock management, days	32.47	32.72	34.89	1.03	1.02	0.96

8	Other current assets management, days	1.00	1.91	1.03	1.31	0.69	1.28
9	Fixed assets management, days	427.80	1000.87	648.93	1.62	0.69	1.07
10	Other non-current assets management, days	11.24	8.45	7.23	0.80	1.06	1.24
11	Debt load	0.096	0.026	0.006	0.44	1.66	3.00
12	Level of interest-free liabilities in the equity	0.25	0.33	0.28	1.14	0.88	1.02

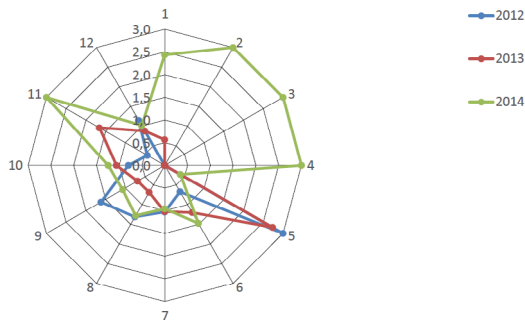
Source: calculated by the author's upon the data of financial reporting of SE "Izmail sea trade port".

Please, pay your attention to the fact that for the calculation of the results, the author introduced the following rules:

1. The quantitative meaning of the elements of ROE-model should not be negative. In the case it is negative it is taken with zero meaning.
2. For convenience reasons and visualization quality we would enter the limitation for the scale of standard deviation. In our case it equals to three.

For the analysis of SE "Izmail Sea trade port" in 2012-2014 the calculated figures, shown in Table 2 can be represented as a 12-final star – ertsgam, which is an effective tool for comparative analysis of business-models. Ertsgam shows the changes of coefficient in dynamic. Graphical representation of a 12-factor model ROE is shown on Figure 4.

FIGURE 3. Business-model visualization of the SE "Izmail sea trade port" in 2012-2014



Source: own development.

According to the calculations in Table 2 and as it is clearly visible on ertsgam for the period 2012-2014 the business-model of SE "Izmail sea trade port" positive changes took place. In particular, we can see an increase in such effects as: gross margin, the effect from financial activities and tax effect, the effect

from commercial and managerial costs.

The results of the 12-factors decomposition of ROE for the SE “Reni sea trade port” for the years 2012-2014 are shown in Table 3.

TABLE 3. Financial performance of SE “Reni sea trade port” in 2012 - 2014, thous. UAH

№	Performance	2012	2013	2014
1	Net sales income (for products, jobs, services)	31 091	44 571	40 183
2	Gross profit	-7 520	8 017	9 669
3	Profit before taxation and credit payments	-13 808	1 865	1 167
4	Profit before taxation	-14 496	1 501	1 739
5	Net profit	-14 496	1 187	1 739
6	Cash funds	464	987	2 122
7	Receivables	3 104	4 041	1 962
8	Stocks	1 161	932	1 303
9	Other current assets	69	86	40
10	Fixed assets	116 520	31 429	30 755
11	Other non-current assets	8 922	1 649	1 677
12	Borrowed capital	0	0	0
13	Equity	114 031	30 199	30 577
14	Interest-free liabilities	16 209	8 925	7 282

Source: the data of financial reporting of SE “Reni sea trade port”.

The results of the 12-factors decomposition of ROE for the SE “Reni sea trade port” for the years 2012-2014 are shown in Table 4.

TABLE 4. Calculations of the financial and economic performance of the SE “Reni sea trade port” in 2012-2014, thous. UAH for the 12-factors model ROE

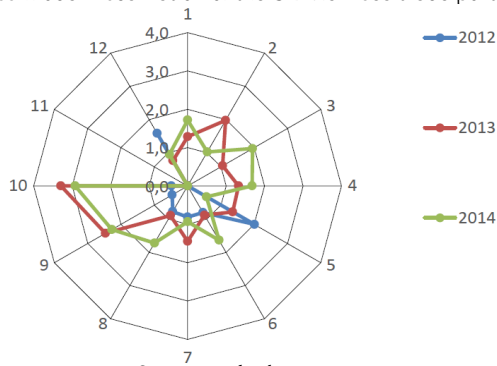
№	Ratio	Analysis meaning			Ertsgam meaning		
		2012	2013	2014	2012	2013	2014
1	Gross margin,%	0	18	24	0.00	1.28	1.72
2	Effect from commercial and managerial costs	0.00	0.23	0.12	0.00	1.98	1.02
3	Effect from financial activity	0.00	0.80	1.49	0.00	1.05	1.95
4	Tax effect	0.00	0.79	1.00	0.00	1.32	1.68
5	Cash funds management, days	5.45	8.08	19.28	2.01	1.35	0.57

6	Receivables management, days	36.44	33.09	17.82	0.80	0.88	1.63
7	Stock management, days	13.63	7.63	11.84	0.81	1.45	0.93
8	Other current assets management, days	0.81	0.70	0.36	0.77	0.89	1.72
9	Fixed assets management, days	1367.91	257.38	279.36	0.46	2.47	2.27
10	Other non-current assets management, days	104.74	13.50	15.23	0.42	3.00	2.92
11	Debt load	0.000	0.000	0.000	0.00	0.00	0.00
12	Level of interest-free liabilities in the equity	0.14	0.30	0.24	1.58	0.76	0.95

Source: calculated by the author's upon the data of financial reporting of SE "Reni sea trade port".

For the analysis of SE "Reni sea trade port" in 2012-2014 the calculated figures, shown in Table 2 can be represented as a 12-final star – ertsgam, which is an effective tool for comparative analysis of business-models. Ertsgam shows the changes of coefficient in dynamic. Graphical representation of a 12-factor model ROE is shown on Figure 5.

FIGURE 4. Business-model visualization of the SE "Reni sea trade port" in 2012-2014

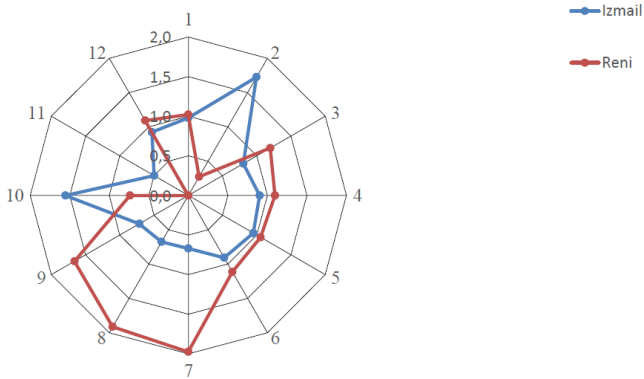


According to the calculations in Table 4 and as it is clearly visible on ertsgam for the period 2012-2014 the business-model of SE "Reni sea trade port" as well positive changes took place. In particular, we can see an increase in such effects as: gross margin, the effect from financial activities and tax effect, the effect from commercial and managerial costs. Cash management deteriorated

as a result of the fact that the volume of money funds by 2012-2014 increased in 26 times, while net income rise was only 23%.

Ertsgam can also be used for comparative analysis of business-models of enterprises. Example of comparative ertsgam is shown in hammy shown on Figure 5.

FIGURE 5. Comparative business-model visualization of the SE “Izmail sea trade port” and “Reni sea trade port” in 2014



Source: own development.

As the figure shows, in 2014 SE “Izmail sea trade port” got the advantage in terms of management for the following performance: the effect of the commercial and administrative costs; management of non-current assets and other current assets; debt loading. The business model is more effective for the SE “Reni sea trade port” upon the indicators: gross margin, the effect of financial activity, tax effect, cash funds management, accounts receivable management, inventory management, control other current assets management, fixed assets management, the level of interest-free liabilities in the equity.

Principles and methods of Total Quality Management (here and after TQM) should be the part of the port strategy. The modern competitive ports are to become involved to the global transport environment with a customer orientation. This kind of ports, defined by Constantinos I. Chlomoudis as Total Quality Management Ports (here and after TQP) are the fourth generation in the port generation classification of UNCTAD. For TQP quality control and certification are not enough to correspond the environmental changes, which are characterized by instability, unpredictability, variability and high level of competition. The core description of this poert can be described through the business-model, based on the total quality approach. According C.I. Chlomodis and Christos D. Lampridis European Quality Award is not a model of

TQM, but a business-model^[15]. The European Foundation for Quality Management – EFQM was founded in 1988 with the support of European Organization for Quality and European Commission. As European experts underline “technologies itself have no specific value. Its value is determined by the business-models, that introduces them to the market”^[16]. So, for the purpose of this research the following business-model definition should be used: it is the mechanism of creation and keeping the enterprise added value, which demands strategic decision-making upon the following directions: customer segment selection; value propositions formation; choice of the distribution channels; customer relationships; income flows generation; key resources; key activities; key partnerships according to the structure EQA TQP.

The important moment of the optimization of the existing or development of the new business-model is the determination of the form, which will be used for the visualizing. The basic blocks, that business-model consists, are constructed from the certain key elements:

1. clients: the target group of clients (for new products, services, decision); distribution and sales channels; the interaction mechanism with the target group of clients;
2. value suggestion: new products; new services; new decisions;
3. the system of value creation: chain of value creation (for new products, services, decision); infrastructure, necessary to create the value; cooperation or partnership model for clients or suppliers; technological platform;
4. financial model: cost structure; income structure; financial flows scheme.

The matrix, which consists of these building blocks is presented for the sea trade port on the Figure 6.

This study is based on fragments of existing theories, but is beyond their frameworks. The scientific contribution of the author is suggestion the methodology of dynamic and comparative analysis of the sea trade ports business-models. The present approach may be the justification for transformation and configuration of business-models changes. Prospects of the further research is the analysis of business-models in various industries by determining the list of activities that are performed to create added value.

^[15] C.I. Chlomoudis, C.D. Lampridis, *A Business Excellence Approach for the Port Industry*, paper presented at the International Conference “Shipping in the era of Social Responsibility” In Honour Of The Late Professor Basil Metaxas (1925-1996), Argostoli (Cephalonia, Greece) 2006.

^[16] *The European Union explained: Research and Innovation*, European Commission, Brussels 2014, <http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2470-inso-2-2014.html> (accessed 21.09.2018).

FIGURE 6. Business-model visualization upon four blocks – Sea trade port case

SYSTEM FOR ADDED VALUE CREATION	VALUE SUGGESTION	CLIENTS	
Cooperation or partnership model for clients or suppliers	Products, services, complex decisions	Distribution channels	Objective groups of clients
Infrastructure	Technological innovations	Exhibitions	Affiliated persons
Logistic centers	Partnership forms of collaboration	Internet	Corporate clients
Cooperation or partnership model for clients or suppliers	Total quality	Mechanism of interaction with clients	Natural persons
Objects of leasing, real estate, investment credits	Long-term projects with added value creation (concession)		New clients
Information management system	Service structure		
Web-site of the port	Outsourcing		
FINANCIAL MODEL			
Cost structure	Income structure	Financial flows scheme	
Cost of cargo processing, cost of cargo storage, vessels loading and unloading, rent costs, port services costs, cost for water ways support, exploiting costs, direct costs, social payments, fuel and energy, materials, taxes and anchorage fee.	Cargo processing, cargo storage, vessels loading and unloading, passenger services, forwarding and warehouse operations, shipping agency and complex fleet service, towing operations, rent income, income of the usage of the territory, premises, stocks, containers, informational provision, international activity, safety vessels parking, other income.	Clients	Operators
		Sea trade ports	Administration of the sea trade

Source: own development.

COMPLEMENTARY ASSETS AND MULTIDIMENSIONAL INNOVATION AS A BASIS TO FORM THE ENTERPRISE BUSINESS-MODELS

The aim of the paragraph is to substantiate the usage of the complementary assets as a perspective basis of the enterprise business-model formation. The purpose of this study is to develop a theoretical approach to forming enterprise business-models through innovation and complementary assets.

To reach the best competitive position it is necessary to enhance the relationship with the consumer, to form a strong position to meet the demand of the market. For this purpose the enterprises organizes its activities according to the chosen business-model to create value added and value for the consumer. Identification of factors and foundations of this model formation is of high interest and acquires relevance in the modern economy.

The essence of the concept of “complementary assets” in XIX century was revealed by Friedrich von Wieser, Francis Edgeworth, Carl Menger. Recent studies were conducted by foreign scientists: Paul Milgrom, John Roberts, Frank T. Rothaermel, David J. Teece, Mary Tripsas, and in particular, Ukrainian reaseacher Anna N. Baranska. They offered the approaches to classifica-

tion of complementary assets, represented their characteristics in the context of ownership right. A number of modern scholars of the XX - XXI centuries empirically revealed the impact of the availability of complementary assets for the investment attractiveness of the enterprise and the value it creates for the consumer. Among them are Yu Jiang, Manuel Espitia Escuer, Soh Pek-Hooi, Gema Pastor-Agustin, Marisa Ramirez-Alesón.

However, studies of complementary assets potential as a factor of enterprise business-models formation have been left unattended by Ukrainian and foreign researchers. The purpose of this article is to substantiate the use of complementary assets as a promising basis for the formation of enterprise business-models.

The term “complementarity” was introduced in 1881 by Francis Edgeworth, who believed that the two activities are complementary businesses, if one activity improving leads to a higher return on other kind one. Reverse understanding of the concept suggests that the increase of investments in one asset without the input to another devalues the effect of investments in the first. That is, the complementary assets complement each other. In particular, the inability to obtain economic benefit from goods and services in the market could be explained by the lack of access to essential complementary assets: infrastructure, resources, government support, finance, information technology, marketing channels. The most sustainable competitive advantage is achieved in the case of a monopoly on complementary assets^[17].

The presence of mutual added or complementary assets is becoming the foundation of harmonization of enterprise product strategy, partnership development strategies of the production chain. This leads to the efficient use of property and factors of production, coordinated functioning of the organizational structures and opportunities for competitive advantage. H.W. Chesbrough defines “open innovation” as a paradigm that involves the use by the organizations not only internal developments, but also opportunities and ideas from the outside members^[18]. Thus, the business-model of companies can be based on partnership and outsourcing services.

Etymological expression of the term “complementarity” is displayed the latin word “complementum” that means complement. In economics, this term was used first by C. Menger, Austrian School of Economics^[19]. In his book *Principles of Political Economy* he distributed economic benefits in order to substantiate the principle of complementarity and the production of goods of different orders. In particular, for the production of bread (first-order benefit) it is necessary to use the second-order benefits (water, fuel). Even the presence of third-order benefits

^[17] В. Макаров, *Об экономическом развитии и не только в контексте будущих достижений науки и техники*, “Вопросы экономики” 2009, № 3, p. 33-34.

^[18] Г. Чесбро, *op. cit.*

^[19] K. Menger, *The Foundation of political economy. The Austrian school in political economy*, Moscow 1992, 496 p.

will not allow to produce bread. F. von Wieser in his research *Theories of social economy* was developing these ideas. He believed that factors of production are complementary, but none of them - labor, land, capital – creates revenue by itself. For the smooth conduct production manufacturer must be able to make up his mind about the extent to which each of the participating interacting factors in creating income in each case. He must be able to determine which part of the whole product meets the productive forces^[20].

Three types of the complementarity can be distinguished by the purpose of use:

1. reinforcing complementarity – are assets involved to the same direction of work in the technological chain, such assets may not be mutually commute.
2. flanking complementarity – achieving of the planned purposes, which is dependent on the conditions that are supportive between different assets (for example, the availability of intellectual property, technologies).
3. compensation complementarity – is the situation where the use of an asset blocks the effects caused by other asset (eg, social security of the staff)^[21].

The key definition of complementary approach is complementarity, the key effect in multiplication^[22].

The theory of complementary assets is based on research of P. Milgrom and J. Roberts *The economy of modern manufacturing: technology, strategy and organization*^[23], which introduced this concept. Initially it was used for the market in the following sense: products are considered complementary if the price reduction of one of them leads to increased demand for another, if the increase in sales of one of them increases the marginal return on another (for example, cars and tires). Their concept covered by this definition both: resources and assets. Complementary assets are those assets for which the following condition is implemented: the effect of investments in one asset in the absence of investment in the other is zero or negative. Thus, for a positive outcome the simultaneous development and use of complementary assets is required. Complementary assets should be developed together. Based on the definition it can be stated that for an enterprise the degree of use of outsourcing, lease or concession of assets is inversely proportional to the degree of their complementarity. Activities or business-processes that are fundamental to generate revenue and value added should be realized within the enterprise, oriented to the long term development and synergy. The activities, which are based on the use of complementary assets

^[20] F. Viser, *Theory of public economy. The Austrian school in political economy*, Moscow 1992, 496 p.

^[21] M.I. Abuzyarova, *The complementarity of companies' assets as an effective tool for managing innovation projects*, "London Journals in Economics, Marketing, Finance, Business and Innovation" 2015, vol. 2, p. 7-17.

^[22] Е.В. Долженкова, М.А. Казакова, *Комплементарный и синергетический подходы к инновационному развитию социально-экономических систем*, "Экономика и предпринимательство" 2015, № 10 (issue 2), p. 559-563.

^[23] P. Milgrom, J. Roberts, *The Economics of Modern Manufacturing: Technology, Strategy, and Organization*, "The American Economic Review" 1990, № 80 (3), p. 511-528.

can not be developed separately and independently. They are a source of added value, should therefore be protected from risks to prevent the implementation of the overall risk of bankruptcy^[24].

D.J. Teece considered that ownership for the complementary assets define the subject who would receive the profits^[25].

A.N. Baranska believes that complementary assets are the potential source of competitive advantage, these are the related assets the use of which brings a synergistic effect and reduces the possibility of simulating competitors product or service imitation (eg, additional technologies, services, distribution assets)^[26].

Complementary advantages lead to strategic synergy. The interaction of complementary assets within the enterprise or partnership creates added value for the consumer, increases the benefit of the assets owners. It is possible the allocation of costs, which increases profitability. If the complementary assets are unique, it leads to a monopoly position of its holders. Enterprises achieve sustainable development if they do not only possess or acquire complementary assets, but also protect them and access to them. An example of this approach is the functioning of hierarchical structures, diversified or connected through the technology chain. If the assets owner is a partner, it is mandatory to establish monitoring of its behavior and to ensure the presence of certain restrictions on use of the know-how, trade secrets, knowledge or technology in the business model^[27]. The need for systematic acquisition of complementary assets (resources) carries out the negative impact on the company, because the owners (sellers) will always seek to obtain of value created for consumers. This procurement within the business model should be provided in the form of gradual redemption or through legal protection of intellectual property (lease, concession, joint patent, obtain a general license).

Research of the complementary assets is related to the search for answers to questions about the optimal mix of resources for the creation of added value. Although complementary assets are considered in terms of the positive impact they can have the opposite effect, particularly on investment. On the one hand, they can reduce costs of the enterprise, on the other, can lead to flexibility restrictions. Complementary assets enable protection from major assets from the competitors. Possibilities to achieve organizational synergies of tangible and intangible assets increased in the presence of complementary ones. Investment

^[24] Д.А. Буянов, *Теории транзакционных издержек и комплементарных активов как теоретические платформы для построения модели аутсорсинга*, "Вестник Омского университета. Серия «Экономика»" 2014, №2, p. 160-165.

^[25] D.J. Teece, *Profiting from technological innovation: implications for integration, collaboration, licensing and public policy*, "Research Policy" 1986, №15, p. 285-305.

^[26] А.Н. Баранская, *Эволюция концепций конкурентного преимущества организации в науке стратегического управления. Известия высших учебных заведений, "Социология. Экономика. Политика"* 2010, № 4 (27), p. 11-15.

^[27] G. Hamel, *Learning in international alliances*, "Strategic Management Journal" 1991, vol. 12, p. 83-103.

in complementary assets may be irreversible. As the study showed^[28] for tangible assets the decision to start or stop investment does not depend on intangible assets and is based on fixed costs. The combination of assets that includes complementarities in the context of the impact on the investment progress shows that the historical evolution of the company, which is the owner of complementary assets may limit its strategic choice^[29].

According to D.J. Teece, innovation that embodies the know-how should be used together with the other assets or ability to generate profits in the market. These assets are the supply chain, marketing, brand. The process of using complementary assets pursues goals of consuming know-how, that are embodied in innovations, by final consumer. This goal achieving is possible under the following conditions:

1. Complementary assets correspond to innovation. The enterprise must obtain exclusive access to the assets and create barriers for those from whom there is demand for them.
2. Company gets first right to the assets use and constantly improves product (service) or creates new products (services) instead of the old ones.

There are complementary assets of market and non-market origins. Complementary assets market origin – are local expertise, experience and expertise with consumers distribution brand. By the complementary assets are non-market origin of subsidies, tax exemptions, preferences, licenses, political ties^[30].

Complementary assets of the non-market origins arise due to state support, for instance in the state-owned enterprises. They are a source of market power to their owners and the purpose of the competition for those who want to own them. Whatever type of complementary assets derived or dependent (positive) from the core assets. Their effectiveness depends on their organization of property relations. Possible is the form in which one person possess the basic and complementary assets. Otherwise, various forms of joint ownership are used, such as forming partnerships, joint venture. Joint ownership is expedient if the maintenance and development of complementary assets is expensive and uneconomical for the owner of the core main assets, or if ownership of complementary assets should remain under state for strategic purposes.

The institutional environment can be highly or partially restricted in terms of the presence of barriers and rules on access to the market of entities through the state regulation. In a highly restricted environment entry barriers to new market is difficult to overcome because of the national protectionism. Preferential access to complementary assets are primarily opened for the state-owned enterprises or branch of central state-owned enterprises (e.g. Administration

^[28] G. Pastor-Agustín, M. Ramírez-Alesón, M. Espitia-Escuer, *Complementary Assets and Investment Decisions*, “Emerging Markets Finance & Trade” 2011, vol. 47, suppl. 5, p. 25-39.

^[29] Ibidem.

^[30] S. Pek-Hooi, Y. Jiang, *Institutional environment and complementary assets: Business strategy in China's 3G development*, “Asia Pacific Journal of Management” 2010, vol. 27 (4), p. 646-675.

of sea ports of Ukraine and its affiliates). The implementation of this right provides monopoly and demand for complementary assets owner services. If the development of the company needs to attract additional assets, there is a need of the formation mechanisms of attraction with simultaneous protecting of the existing complementary assets. Possible forms of involvement can be: buying and selling of complementary assets to obtain economic rents in the case of sale; the formation of a joint venture, public-private partnerships; signing the concession lease or licensing rights of access to complementary assets (see. fig.7):

FIGURE 7. Complementary assets access formation

Partially restricted institutional environment	<p>Quadrant 3</p> <p>Forming of the joint enterprise with foreign capital with the ownership right on the complementary assets</p> <p>Sequences:</p> <p>Creation of the new legal entity with foreign capital and ownership right on the specialized complementary assets</p>	<p>Quadrant 4</p> <p>Forming of the strategic alliance with the access right on the complementary assets through concession</p> <p>Sequences:</p> <p>Investors receive the partial access to the generic complementary assets because of the input of the own complementary assets to the enterprise functioning (technology, expertise, financing)</p>
	High restricted institutional environment	<p>Quadrant 1</p> <p>Forming of the state-private partnership with the ownership right on the complementary assets</p> <p>Sequences:</p> <p>The corporate enterprise should be created with partially private capital of the country residents in order to receive the joint right to use the specialized complementary assets</p>
	Specialized complementary assets	Generic complementary assets

Source: own development.

Generic complementary assets – are the type of commodity assets, with which can be carried out operations in the commodity market. Specialized complementary assets – are the unique assets that are critical to be able to sell a product or service^[31]. According to D.J. Teece, marketing, competitive production, after-sales support is always needed to reach the final consumer. These

^[31] F.T. Rothaermel, Ch.W.L. Hill, *Technological Discontinuities and Complementary Assets: A Longitudinal Study of Industry and Firm Performance*, "Organization Science" 2005, vol. 16, № 1, p. 52-70.

services are of complementary assets. He divides three types of the complementary assets: generic, specialized, co-specialized^[32].

Generic complementary assets should not only be tailored to a specific product/service, because they are often used in the market based on competition (such as it is – the necessary equipment).

Specialized complementary assets are characterized by one-sided dependence on primary product (service) sales. Joint specialized complementary assets inherent in the bilateral relationship. In particular, the reputation of the company is specialized complementary assets. Additional features exterior design of the car is a joint specialized complementary assets, depending on the power car repairs. List of specialized and generic examples of complementary assets in commercial sea port is provided in the table below.

TABLE 5. Complementary assets of the sea trade port*

Specialized complementary assets	Generic complementary assets
- reputation;	- infrastructure;
- brand;	- equipment;
- formed clusters;	- control and checkpoint capacities (customs control);
- distribution network;	- computer and automatization systems;
- specialists experience and qualification;	- social networks, ERP-networks;
- expertise;	- agreements with the state and municipality.
- sea port community;	
- informative databases.	

Source: own development.

D.J. Teece considers, that the acquisition of specialized complementary assets requires long-term investments. These assets often difficult to imitate. So that they become a source of competitive advantage. The cost of specialized complementary assets can only increase, because even the arrival of new actors creates a demand on them and requires access for them. At the same time, ownership of complementary assets prevents the lack of demand for basic core assets, because of the stimulating their updates on a competitive basis^[33]. The mechanism of this update is that the owners collect complementary assets (assign) rents from manufacturers of new products/services that appear on the market because of complementary assets access.

F.T. Rothaermel and Charles W.L. Hill prove that the new company in the industry initiate technological competence discontinuities discontinues in the market. They act with created competitive advantage in order to obtain the benefits of the sector actors, often causing by Shumpeterian process of creative

^[32] D.J. Teece, *Profiting from technological innovation...*, p. 285-305.

^[33] M. Tripsas, *Unraveling the process of creative destruction: Complementary assets and incumbent survival in the typesetter industry*, "Strategic Management Journal" 1997, № 18, p. 119-142.

destruction, a term he introduced to describe the life cycle of companies^[34]. Changing the balance of power and the dissolution of existing enterprises is particularly intense when complementary assets held by market actors are generic. In this case, new market players are able to compete for complementary assets for the right to use them with higher profitability. Existing businesses can demonstrate a lack of flexibility and progress in the technologies of use of generic complementary assets in the absence of seeking perfection in terms of a monopoly position. At the same time the new companies, which follow the purpose of pursuing access to complementary assets show strong motivation to capture this monopoly.

The rationale dignity of their competitive position is a potential accumulation of higher monopoly rents from the use of complementary assets than in existing businesses through innovation or use of new, more profitable business model. Examples of technological discontinuity is the transition from the use of vacuum tubes to transistors, transistors and later on semiconductors. Another example is the emergence of electronic calculators, which destroyed a direction competences granted precursors within the electromechanical paradigm. In particular, electronic calculators devalued assets of electromechanical complementary competencies, because the new devices did not require specialized service and distribution by professionals.

That is, if the new market actors have access to generic complementary assets which will be additional for major innovation assets, this decline will lead a group decline of acting market subjects, the last owners of common complementary assets. There are exceptions to these cases, which suggests that technological discontinuity does not always lead to the domination of new markets. That ownership right of complementary assets is crucial in the matter of who will receive profits from the production of products or provision of services. Even the existence of this ownership right increases the likelihood that an active market master of the field, which emerged as a new line or reserve its efficiency.

The probability is the higher the more specialized are the complementary assets. M. Tripsas in his study on the example of typewritten enterprises proved that complementary assets owners may even benefit from technological discontinuities if their complementary assets are specialized. In this case, their value only increases^[35]. This effect is particularly pronounced in the condition of low protection of intellectual property or strong sustainable protectionism of owners of complementary assets. Under such conditions, the availability of ownership of specialized complementary assets enables innovative assign rents for new market players^[36]. It is possible the scenario implementation of cooperation between new and existing entities in which there is a symbiosis of com-

^[34] F.T. Rothaermel, Ch.W.L. Hill, op. cit., p. 52-70.

^[35] M. Tripsas, op. cit., p. 119-142.

^[36] D.J. Teece, *Profiting from technological innovation...*, p. 285-305.

plementary assets and positive new fixed assets. Through this cooperation, on the one hand, a new high added value is created, and on the other hand, a competition in the distribution of this cost arises. Besides the owner of specialized complementary assets as a participant of such an alliance is obtaining stronger market position^[37]. Furthermore, if the system of sales and other marketing tools of the holder of specialized complementary assets are not sensitive to the effects of changes arising as a result of new inventions, created by existing businesses value can be increased even without forming an alliance for specialized complementary assets become more attractive to new market players. Specifically, from new market players the demand for specialized complementary assets of existing enterprises arises. Their assets can be combined with a new asset to improve the profitability of both players^[38].

In particular, ownership of specialized complementary assets has allowed pharmaceutical companies to establish alliances with biotech companies. This act not only helped them to adapt to innovation, but gave the possibility if the accumulation of innovation rents^[39].

Thus, in terms of technological gaps cooperation of new and existing market players strengthens the market position of the actors, if it has specialized complementary assets, as this allows him to assign innovation rents by combining with the new subjects of innovative system.

Complementary assets – are the assets that are mutually combinatorial and complete each other, than achieve a synergistic effect for access to the consumer in terms of highest return for providing the ability to create added value for the consumer. The result of their interaction is the development of partnerships within the value chain of product/service delivery. The subject of partnerships is access to complementary assets.

Reinforcing, flanking and compensation complementarity can be distinguished. By origin distinguish between market and non-market complementary assets; the conformity of a product or service – specific and general. Reinforcing, flanking and compensational complementarity can be distinguished. By the origin there are market and non-market complementary assets; by the correspondence to the product or service – generic and specialized.

The following properties are inherent for the complementary assets:

Complementary assets inherent to the following properties:

1. Synergetic effect is possible to be provided in the case of the simultaneous develop-

^[37] J. Lerner, R. Merges, *The control of technology alliances: An empirical analysis of the biotechnology industry*, "Journal of Industrial Economics" 1998, № 46, p. 125-156.

^[38] D.J. Teece, *Competition, cooperation, and innovation. Organizational arrangements for regimes of rapid technological progress*, "Journal of Economic Behavior Organisations" 1992, № 18, p. 1-25.

^[39] F.T. Rothaermel, *Complementary assets, strategic alliances, and the incumbent's advantage: An empirical study of industry and firm effects in the biopharmaceutical industry*, "Research Policy" 2001, № 30, p. 1235-1251.

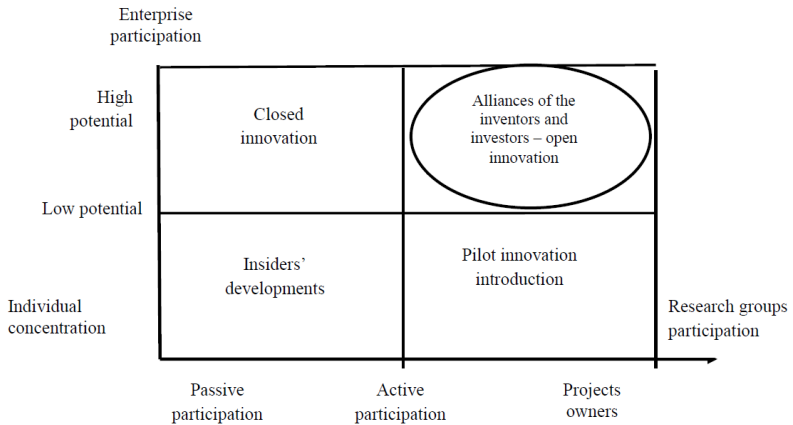
ment of complementary assets.

2. The uniqueness of the complementary assets leads to a monopoly of their owner.
3. The ownership right on the complementary assets is crucial to determining the recipient of the income.

To receive the access right to the complementary assets is happening in determination of their kind and is possible through the formation of the: joint enterprise, state-private partnership, strategic alliance and licensing, preferential or outsourcing agreements for the complementary assets usage. According to the business-model definition the advisability of engaging the complementary assets as a basis for business-model formation is justified because of their ability to provide the monopolistic position of the complementary assets owner. The added value, demanded by the customer, is created as a result of synergetic interaction of complementary assets. Thus the resource application is taking place in the conditions of the added value increase, which is created by the enterprise.

The further research in this direction are presented in the Figure 8.

FIGURE 8. Matrix of innovation generation

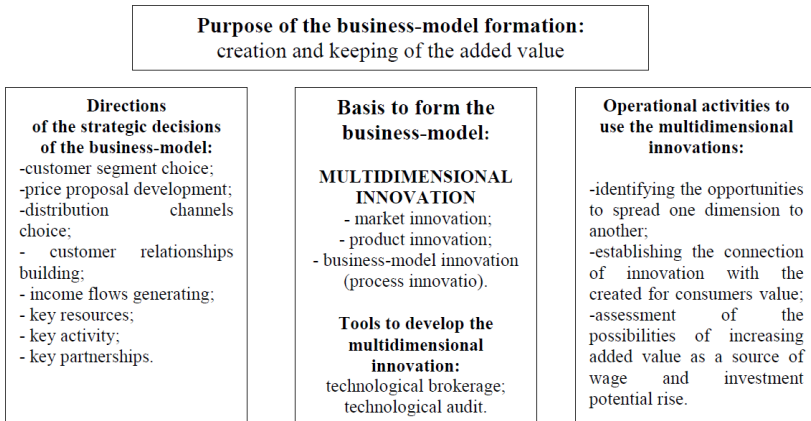


Source: own development

According to the law of the system theory, innovative system, like any other system should not be closed or isolated. The positive effect of the system components is manifested its arithmetic properties through multiplication effect. According to another principle of the same theory: “it is impossible to affect the system, while being inside the system”. That’s why the innovation that is the foundation of business -model should initiate the multiplied positive effects of its introduction. Multidimensional innovation, which is a combination of market innovation, product innovation and arised innovation of the

business-model can be a catalyst to create and increase the added value of the enterprises (Figure 9).

FIGURE 9. Business-model formation through multidimensional innovation



Source: own development.

The business-model is a mechanism to create and store of added value, which requires strategic decisions in the following areas: selection a consumer segment; pricing offer; choice of distribution channels products; relationships with customers; the generation of revenue streams; key resources; key activities; key partnerships. Using multidimensional innovation underlying the business-model must be accompanied by the following operational activities: identifying opportunities to spread one dimension to another; establish the relationship of innovation with value created for consumers; assessment of increasing added value as a source of wage income and investment potential.

Innovation, which will be the basis of formation of business-model should initiate the creation of new products, processes, services, business-models and markets of sufficient differentiation and such a speed that allows the company to maintain the required yield for shareholders in the long run. The impact of three key imperatives such innovation is manifested in the following:

1. Due to differentiation of the suggestions, processes, change of the index value of output per unit cost of production yield area can be extended.
2. Faster enter to market will reduce the negative cash flow of the early life cycle of new products and accelerate the flow of profits.
3. Innovations of technological discontinuities can ensure the growth of the company potential and refocus the business-model for new competitive advantages in new or established market.

Innovation of the business-model is different in the fact that the result from its implementation is their competitive advantage, which persists longer than the introduction of product innovation and process innovation. It is more difficult for copying. These innovations are radical and are more subversive potential^[40].

The innovation introduction allows you to create new market space, where so far there is no competition and that makes it possible to occupy a monopoly position. Such a position for its period of action provides a steady income for the enterprise.

The use of closed or open innovation model is not enough to form an effective business-models if their use does not lead to systemic changes. The scientific contribution of the author is to introduce the concept of “multidimensional innovation”, which is a combination of market innovation, product innovation and the resulting impact these innovations, that spread on the innovation of the business-model. The generation of multidimensional innovation is taking place through the technological brokerage and technological audit. A group of indicators to measure the effectiveness of the strategy of technological brokerage and its expected results were developed. Performance measurement of the technological brokerage includes: funding of joint research agreements that have led to innovation introduction; the number of embedded discoveries, patents, license agreements, new businesses; the amount of revenue from the commercialization of scientific, technical and research activities of research groups. The expected results of the knowledge (technological) brokerage may consist of: increase in added value; rise in the effectiveness of innovation introduction from the point of time and cost reduction;

Innovation life cycle continuation through recombination of resources, technology, research groups, manufacturing facilities; increase in the number of transactions of technology and knowledge transfer; increase in the number of partnerships for innovation; increase in revenues from the commercialization of science, technology and scientific research institutions; increase in income from the transfer of knowledge and technology and intellectual property management; creating an integrated system of support and protection of intellectual property, including the results of scientific, technical and research activities.

Multidimensional innovation as the basis for a business-model can increase the added value, which is the source of wages, profits and investment potential of the company. The present approach may be justification for the formation and configuration changes of the enterprise business-models.

^[40] М.Л. Джордж, Дж. Воркс, К. Вотсон-Хемфилл, *Стремительные инновации*, Київ 2006, 350 р.

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